

ZOOLOGY.—*Porifera from Greenland and Baffinland collected by Capt. Robert A. Bartlett.*¹ M. W. DE LAUBENFELS, Pasadena Junior College. (Communicated by WALDO L. SCHMITT.)

The collections of Arctic sponges on which this report is based were dredged by Capt. R. A. Bartlett in August 1927, July 1931, August and September 1933, and July 1940. Twenty-one species are represented. Nine species and one genus are new.

Class DEMOSPONGIAE

Haliclona permollis (Bowerbank)

This species was described as *Isodictya permollis* by Bowerbank (1866, p. 278). It is one of the few sponges with a wide distribution taken by Captain Bartlett; it is cosmopolitan and abundant.

The specimen in the present collection is a mass a little over 1 cc in size. The spicules and their arrangement are typical. In other respects the smallness of the specimen precludes satisfactory comparison. It was dredged in Fox Basin, lat. 66° 43' N., long. 80° 07' W., at a depth of 32–37 fathoms, August 12, 1927.

Isodictya histodermella, n. sp. Fig. 1 A

The holotype (U.S.N.M. no. 22688) was dredged July 22, 1940, at a depth of 60 fathoms, Parker Snow Bay, NW. (true) of Conical Rock. A second specimen was dredged August 12, 1927, in Fox Basin, lat. 66° 43' N., long. 80° 07' W. This is a fragment of finger-sized projection similar to those on the larger specimen.

The holotype is a palmate-shaped mass with several projections the size and shape of fingers. The whole is 15 cm high and between 1 and 2 cm thick. The consistency is spongy, and the color the usual pale drab of sponges that have been preserved for some months. The surface is nearly smooth, microscopically slightly hispid, with no detachable or special ectosome present. The oscules are 2 to 3 mm in diameter, mostly scattered, occurring chiefly along the narrower edges of the digitate projections. The endosome is somewhat cavernous, the interior being much more "open-work" than the outer portion, so that the sponge may almost be described as "hollow." The megascleres are oxeas approximately 14 by 270 μ . The microscleres are palmate isochelas 30 to 40 μ long.

¹ Received May 25, 1942.

The specific name is given in recognition of the structural resemblance of this sponge to specimens of the genus *Histodermella*, which is remarkable for having just such an open-work but not quite hollow interior. In other respects the resemblance ceases. The spiculation in particular is very different. No other species of *Isodictya* is especially close to the one under discussion; it may, however, be compared with the genotype, *Isodictya palmata*, originally described as *Spongia palmata* by Lamarck (1814, p. 452). Superficially the genotype looks like *Isodictya histodermella*, but its interior is far less cavernous. The microscleres of *I. palmata* (Fig. 1, B) are rather peculiar in shape, whereas those of the species here described are typical isochelas.

Orina consimilis (Lundbeck)

This species was described from the Arctic, as *Gelliodes consimilis* by Lundbeck (1902, p. 77). A very similar species is the sponge described as *Gellius arcoferus* by Vosmaer (1885, p. 29). The latter is also Arctic, as are many other species and specimens of the genus *Orina*.

The specimen in the present collection, taken August 31, 1927, at the southeast corner of Fox Basin, lat. 66° 46' N., long. 79° 15' W., is remarkable for having toxas of two thicknesses. The larger are about 5 by 100 μ , the smaller only 2 by 100 μ . For this reason one might be tempted to describe it as a new species, but the other characters are typical.

Iophon piceus (Vosmaer)

This species was described as *Aleblion piceum* by Vosmaer (1882, p. 42), from the Arctic. It is here proposed that the following species be dropped in synonymy to *piceus*: *Reniera dubia* Hansen (1885, p. 5), from the Arctic, and *Iophon frigidus* Lundbeck (1905, p. 183), from Greenland. Neither *piceus* nor *dubia* is adequately known, but from what information is available they seem to be conspecific with the well-described *frigidus* and the specimens under discussion. The latter have megascleres and anisochelas only about 70 per cent as large as those of Lundbeck's Greenland species, and have bipocilli far more abundant. These differ-

ences, however, do not warrant setting up a new species for Bartlett's material, which consisted of two Fox Basin specimens, one from lat. $66^{\circ} 43' N.$, long. $80^{\circ} 07' W.$, August 12, 1927, from a depth of 32–36 fathoms; the other without detailed locality data, taken August 26, 1927, from 25–31 fathoms.

Myxilla incrustans (Johnston)

This species was described as *Halichondria incrustans* by Johnston (1842, p. 122). It is abundant in the north Atlantic and Arctic regions. Captain Bartlett dredged this sponge at 32–37 fathoms in Fox Basin, lat. $66^{\circ} 43' N.$, long. $80^{\circ} 07' W.$, August 12, 1927, and at a depth of 32–37 fathoms on August 13, 1927.

Myxilla acribria, n. sp. Fig. 1 C

The holotype (U.S.N.M. no. 22689) was dredged in Fox Basin in 1933; detailed locality data are lacking. It is an amorphous mass 1 by 1.5 by 2 cm in size. The consistency is spongy and the color dull brown. The surface is finely hispid and lipostomous. The structure consists of plumose ascending columns, with the same sort of spicules echinating and coring the tracts.

The principal megascleres are commonplace smooth styles 12 by 465μ . There are some special dermal tylotes with microspined heads; total size about 9 by 375μ . The microscleres are anchorate isochelas as typical of this genus, but are a little larger than common, often up to 90μ in length.

The genus *Myxilla* is represented by many Arctic species, some of which are common. The present specimen is as different from these other Arctic *Myxillas* as could well be and still be left in the genus. On the other hand, it is almost identical with one of the few species of this genus from the southern hemisphere. Ridley and Dendy (1886, p. 472) in their "Preliminary Report on the Monaxonida collected by H.M.S. *Challenger*," described *Myxilla cribrigera* from Chile. The specimen collected by Captain Bartlett in Greenland bears an amazing resemblance to *M. cribrigera* in all characters except the important one which Ridley and Dendy selected as a basis for their specific name. Their specimen had well-defined pores arranged in special inhalant areas. The Greenland specimen conspicuously lacks this cribrate structure, which together with the vast geo-

graphical separation, seems to warrant naming it *acribria*, rather than identifying it as *cribrigera*.

Mycale vosmaeri (Levinson)

This species was described from the Arctic by Levinson (1886, p. 20) as *Esperella vosmaeri*. Brøndsted (1914, p. 489) maintained that it was conspecific with *Mycale lingua* (described as *Hymeniacion lingua* by Bowerbank, 1858, p. 305), and his opinion has been generally followed in this regard. This assumes that *M. lingua* is a highly variable species and that *vosmaeri* falls within the range of variation. I disagree, and propose that *vosmaeri* be reinstated as a valid species.

Captain Bartlett dredged this *Mycale* three times: Fox Basin, August 13, 1927, in 34–37 fathoms, and August 26, 1927, in 25–31 fathoms; and Parker Snow Bay, NW. Greenland, July 22, 1940, in 25–45 fathoms.

Levinson's species was supposed to differ from Bowerbank's by lacking the smaller type of anisochelas and by having much smaller sigmas. In some specimens of *lingua* the smaller anisochelas do not seem to be of a conspicuously smaller range, but in all Captain Bartlett's specimens, as in Levinson's, there seems to be no smaller type of anisochela at all. In all Captain Bartlett's specimens the sigmas are even smaller (10 to 12μ) than in Levinson's (20μ); in typical *lingua* they are 27 to 32μ . These sigmas in *vosmaeri* are more strongly contorted than in typical *lingua*. In typical *lingua* the megascleres are smooth substrongyles 750 to 850μ long, but in Levinson's specimen they are 650μ long, and in those collected by Captain Bartlett they range from 600 to 680μ .

Echinoclathria schmitti, n. sp.

The holotype (U.S.N.M. no. 22690) was dredged in Fox Basin, at a depth of 34–37 fathoms, lat. $66^{\circ} 46' N.$, long. $79^{\circ} 15' W.$, August 13, 1927. It is a lamella or fragment of a vase; the piece of the wall is 7 mm thick and 5 cm high. Foreign objects, since removed, have left two cavities 7 mm in diameter, clear through the wall. The consistency is spongy and the color light brown. The surface is even, punctiform, with pores 50μ in diameter, 125μ apart (center to center). The numerous oscules are a trifle under 1 mm in diameter, about 4 mm apart. There is no ectosomal specialization. The

endosome consists of specular tracts about 100 μ in diameter, in a confused specular matrix. The latter could be interpreted as representing specular connections between the tracts, or loosely echinating spicules on them.

The only spicules are styles; many are about 4 by 200 μ , and many others 12 by 220 μ . One might regard these as two distinct types, but there are fairly numerous intermediate-sized spicules.

The only other species of *Echinoclathria* that is very close to this one is the genotype *E. tenuis* Carter (1885, p. 355), from south Australia. The two are very close indeed. There are two reasons for establishing a new species for the Arctic sponge. One is the vast distance between Greenland and Australia, which is certainly inadequate by itself alone but is significant in connection with other differences. The other and more critical difference is that in *tenuis* the interstitial spicules are tylostyles quite unlike those in *schmitti*. Brøndsted (1933, p. 14) described two sponges from Greenland that are practically certainly conspecific with *schmitti*. He very dubiously identified them with *Phakellia beringensis* Hentschel (1929, p. 975). This species is named for Dr. Waldo L. Schmitt, of the United States National Museum.

Halichondria fibrosa (Fristedt)

This species was described as *Amorphina fibrosa* by Fristedt (1887, p. 426), from the Arctic.

Captain Bartlett dredged this species on September 5, 1933, between the Island of Ooglit and the Eskimo village of Pingitkalik, north-east of Melville Peninsula, Fox Basin, near the entrance to the Fury and Hecla Straits. Earlier, on August 26, 1927, he dredged a sponge from Fox Basin, in 25–31 fathoms, that is probably conspecific. It is similar in spiculation and structure but is different in external shape. One side is astonishingly smooth and imperforate, as if it had been closely affixed to some smooth flat substratum. The other side is extremely cavernous, as though it had been loaded with foreign objects since removed.

Cioxeamastia, n. gen.

This genus is erected for the following species (*C. polycalypta*) as genotype. It is of the family Halichondriidae, with spiculation and most other characters quite typical, but differs

in possessing conspicuous closed fistules closely resembling those that characterize the genus *Polymastia* of the family Suberitidae. The genus *Ciocalypta* of the Halichondriidae also has fistules, but these are coarser than those of *Cioxeamastia*. The spiculation of *Ciocalypta* is not typical of its family.

Cioxeamastia polycalypta, n. sp.

The holotype (U.S.M.N. no. 22691) was dredged in Fox Basin at a depth of 34–37 fathoms, August 13, 1927. It is subspherical, 3 cm in diameter, with about 50 closed fistules of the *Polymastia* type, each 1 by 3 mm in transverse section and 4 mm high. The consistency is spongy and the color pale dull yellow. The surface is smooth and lipostomous. The ectosome is not detachable or conspicuously different from the rather dense endosome; in this regard it is not typical of the Halichondriidae. The spicules, as in *Halichondria*, consist of oxeas of great variation in size and in more or less confusion; most of them range in size from 4 by 200 to 12 by 700 μ .

Hymeniacion heliophila (Parker)

This species was described as *Stylotella heliophila* by Parker (1910, p. 766) in his famous discussion of the development of the nervous system. His species is a typical *Hymeniacion* and is extremely close to *H. carnuncula*, the common European *Hymeniacion*. The two may be synonymous. The Greenland specimen is definitely more like the American-Atlantic species (*heliophila*) than the European-Atlantic ones.

Captain Bartlett took this sponge while otter-trawling off Wolstenholm Island, north-west Greenland, in 13–25 fathoms, on July 23, 1940.

Polymastia bartletti, n. sp.

The holotype (U.S.N.M. no. 22692) was dredged in Fox Basin, lat. 67° 45' N., long. 79° 09' W., at 38 fathoms on August 24, 1927. It is subspherical, about 6 cm in diameter, and somewhat flattened on top and bottom. The consistency is firm but elastic, and the color a very pale yellow. The surface is very smooth except that there are about a dozen large conules or fistules about 6 mm high and 6 mm diameter at the base, together with several dozen smaller conules about 1.5 mm high and

2 mm diameter. No oscules are evident. The ectosome is a dense cortex 1.5 to 2 mm thick. The endosome is "crumb-of-bread" and more of the ochre-yellow than is the (paler) cortex.

The ectosomal spicules are tylostyles 6 by 350 to 6 by 400 μ , erect, with points toward the exterior. The endosomal spicules are tylostyles 9 by 540 to 12 by 600 μ ; the larger each is, the less pronouncedly tylote it is. Most of these are arranged in rough tracts about 130 μ in diameter. Between these, there are many spicules strewn in confusion, some of which are as small as 4 by 200 μ .

But for the cone-shaped fistules this would be a typical *Suberites*. One would suggest comparison with *Suberites insignis* Carter (1886, p. 118), from south of Australia, which is described as resembling a nudibranch, but unfortunately not figured. The present species differs from most of the representatives of the genus *Polymastia* in that the latter have much longer fistules. There are, however, two already described with very low fistules, as follows: *Polymastia laganoides* Lambe (1894, p. 129) from Bering Sea (Arctic), which has three sizes of spicules and is probably most closely related to *P. bartletti*; and *Polymastia megasclera* Burton (1934, p. 567), from Australia, which has extremely large spicules.

This species is named in honor of Capt. Robert A. Bartlett.

Tentorium semisuberites (Schmidt)

This species was described as *Thecophora semisuberites* by Schmidt (1870, p. 50) from Greenland. Lambe (1896, p. 198) recorded it from northeastern Canada. The specimen collected by Captain Bartlett is astonishingly like Schmidt's original, even to having just four symmetrically placed oscular chimneys on the dome-shaped upper surface. It was dredged at 20-30 fathoms on September 3, 1933, at the entrance to Fury and Hecla Straits.

Class HYALOSPONGIAE

Trichasterina sagittaria Topsent

This species was described by Topsent (1913, p. 9) from the Arctic. The specimen collected by Captain Bartlett was dredged at a depth of 110 fathoms on July 29, 1931, off East Greenland, lat. 74° 21' N., long. 16° 30' W.

Acanthascus nealus, n. sp. Fig. 1 E

The holotype (U.S.N.M. no. 22693) was dredged at 120 fathoms depth on July 30, 1931, off East Greenland, lat. 74° 04' N., long. 17° 58' W. It is a cone-shaped vase and shows no certain indication of having been erect. It is 10 cm long and 10 cm diameter, with walls about 1 cm thick. The consistency is fragile and the color dirty drab. The walls are pierced by canals of three sizes; the largest are 3 mm in diameter, the medium ones nearly 1 mm in diameter, and the abundant smaller ones are microscopic. The surface is nearly smooth, not at all hispid.

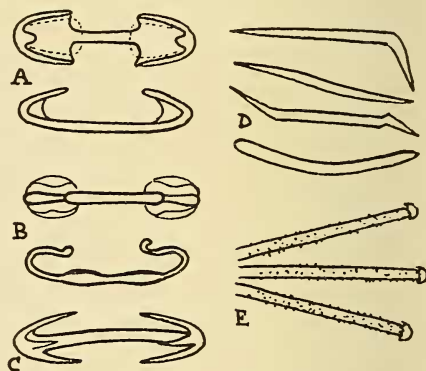


Fig. 1.—A, Microscleres of *Isodictya histodermella*, n. sp., $\times 750$; B, microscleres of *Isodictya palmata*, from Bowerbank, "Monograph of the British Spongiadae," 1866, plate 52, $\times 750$; C, microscleres of *Myrilla acribria*, n. sp., $\times 250$; D, microscleres of *Leucettusa usa*, n. sp., $\times 205$; E, microscleres of *Acanthascus nealus*, n. sp., ends of the discoasters, $\times 500$.

Another specimen was dredged the same day at the same place. There are a number of fragments each about the size of the palm of the hand. It would appear that if fitted together correctly they would form a cone-shaped vase 15 cm long and 11 cm in diameter at the open end. This vase, however, to judge from its attachments to rocks, was decidedly not upright, but lay on its side as it grew. The pointed end clearly shows that it was not attached. The walls vary from 5 cm thick at the open end of the cone to 15 mm thick as the closed (pointed) end of the cone is approached.

The bulk of the spiculation consists of diactines up to 65 μ in diameter and 20 mm long. These make a felted mass. Their ends often are strongylote and microspined. The dermal and

so-called gastral spicules are regular hexactines, each ray about 10 by 200 μ and entirely microspined; a few are pentacts and stauroacts. They are somewhat smaller in the smaller of the two specimens. The microscleres consist of abundant commonplace oxyhexasters 125 μ in diameter, and discohexasters of the same diameter. The latter were not found in the second (larger) specimen but may have been really present, or possibly washed out as the specimen was in a damaged condition. They are not typical for this genus.

In spite of minor differences these two specimens may be confidently regarded as conspecific. The evidence that they grew naturally on one side is not regarded as peculiar; many other *Hyalospongia* may have grown similarly, but once detached from the bottom by a dredge they cease to give evidence thereof. It is suggested that such tilted positions are associated with a bottom current regularly in one direction rather than currents coming at one time or another from different directions. There are now six species of this genus.

Three are decidedly hispid:

A. cactus Schulze (1886, p. 48), the genotype, from Japan, has dermal and gastral pentacts where most of the others have hexacts. The shape is cylindrical.

A. platei Schulze (1899, p. 45), from California, is like the above but with dermal and gastral hexacts.

A. grossularia Schulze (1886, p. 48), from the Antarctic, is similar to both the above but has two sorts of discohexasters instead of one.

Three are smooth, not hispid:

A. pachyderma Okada (1932, p. 94), from Japan, is similar to *platei* except for being smooth surfaced, thick-walled, and oval.

A. alani Ijima (1898, p. 55), from Japan, is like the above except that it has two sorts of discohexasters instead of one.

A. nealus (new species) from Greenland is similar to *pachyderma* except that it is thin-walled and conical.

Class CALCISPONGIAE

Leuconia ananas (Montagu)

This species was described by Montagu (1812, p. 97) as *Spongia ananas*. It is fairly common in the Arctic and about the Scandinavian coasts.

Captain Bartlett dredged two specimens of this sponge on August 4, 1927, in 25 fathoms, 4 miles east of Cape Dorchester, and one other specimen in Fox Basin, August 26, 1927, at 25–31 fathoms. All three specimens are more distinctly pedicillate than usual for this species.

Sycandra hebe, n. sp.

The holotype (U.S.N.M. no. 22694) was dredged on August 12, 1927, at a depth of 32–37 fathoms, in Fox Basin, lat. 66° 43' N., long. 80° 07' W. It is a cylinder 11 mm high. The lower half is nearly solid and only 1 mm in diameter. The consistency is as fragile as in most *Calcispongiae*, and the color is the usual white. The surface is fairly smooth. The terminal cloaca is less than 1 mm in diameter. The walls are about 170 μ thick, containing often only a single layer of flagellate chambers about 80 μ in diameter, 160 μ long.

The bulk of the spiculation consists of regular triaxons with rays 5 by 50 to 8 by 120 μ . There are diactines with one ray only about 20 μ long, at 120° to the other, which is nearly 300 μ long; their diameter is 15 μ . These occur felted in the wall, often protrude into the cloaca, and sometimes protrude slightly at the surface at an acute angle (nearly tangent) to it.

Associated with the protrusion of these diacts into the cloaca are protoplasmic auxiliaries so that there are cloacal trabeculae. These have hitherto been associated with the solitary species of *Sycandra*, its genotype; this was originally described by Schmidt (1870, p. 74), as *Utriculus*, and is recorded from Greenland and the North Atlantic. Many other sponges were temporarily supposed to be in the genus *Sycandra*, chiefly by Haeckel, but have been removed to the correct genera, chiefly by Dendy and Row.

One must keep in mind the possibility that the present specimen may be a juvenile *Sycandra utriculus*, but data to that effect are wanting as yet. The specimen collected by Captain Bartlett lacks the gastral tetraxons of *utriculus*, and has diactines much smaller than those (12 by 1500 μ) of *utriculus*.

Scypha lingua (Haeckel)

This species was described as *Sycortis lingua* by Haeckel (1872, p. 278) from Newfoundland. The sponge described by Haeckel (1872, p. 333)

as *Sycandra arctica* var. *polaris*, which was elevated to specific rank by Dendy and Row (1913, p. 747) is synonymous with *Scypha lingua*. Captain Bartlett dredged this species from a depth of 25–31 fathoms in Fox Basin, August 26, 1927.

It is notable that another member of the genus *Scypha* has been recorded from western Greenland; this was described as *Sycon karajakense* by Breitfuss (1898, p. 207) but differs strikingly from *lingua* in having small strongyles on the distal tufts where *lingua* has long oxeas.

Sycetta sagitta, n. sp.

The holotype (U.S.N.M. no. 22695) was collected at the west end of White Island, Frozen Strait, Fox Channel, August 10, 1933. It is ovoid, subcylindrical, of typical sycon-type architecture. It is 18 mm high and 4.5 mm in diameter where it is thickest. The consistency is softly fragile and the color is a pale yellow. The surface is nearly smooth, devoid of terminal tufts for the flagellate chambers. The terminal oscule is barely 300 μ in diameter, and the cloaca scarcely wider. The flagellate chambers are about 120 μ in diameter and 450 μ long.

The principal spicules are pronouncedly sagittal triactines, some actually T-shaped. The shorter (paired) rays are about 4 by 100 μ and the basal (unpaired) rays about 5 by 300 μ . The gastral spicules are sagittal as usual, with the apical ray (projecting into the cloaca) somewhat bent. By very careful search two gastral tetractines (or quadriradiates) were found and one freakish pentactine. This is clearly very close to *Sycetta sagittifera* Haeckel (1872, p. 240), from Ceylon, but there are several definite differences between the two species. The Ceylon species has flagellate chambers less packed together, and as a result looks lumpy from the surface, while *sagitta* is smooth. Haeckel records no tetractines at all. Some of his spicules have rays 6 by 800 μ , whereas none of those in the Greenland specimen are nearly that large. As these two closely related species become better known, more differences between them may perhaps be discovered.

Leucettusa usa, n. sp. Fig. 1 D

The holotype (U.S.N.M. no. 22696) was collected in Fox Basin, at a depth of 25–31 fathoms, on August 26, 1927; two others were taken in the same haul, and a fourth was collected August 13, 1927, at 34–37 fathoms in Fox

Basin, lat. 66° 46' N., long. 79° 15' W. This last is the largest of the four.

The shape is very irregularly subcylindrical, in one case wider than high. The sizes are 20 to 34 mm high, 10 to 22 mm wide. The consistency is quite spongy for a Calcisponge, and the color is white. The surface is smooth, with very small pores. The apical oscule is from 2 to 7 mm in diameter, varying directly with the diameter of the sponge, independent of the height. The ectosome has more spicule content, and less protoplasm; the endosome has less spicule content and more protoplasm.

The principal spicules are very large tetractines with angles and actines approximately equal but with one pair of opposite actines often somewhat crooked. The rays are often about 85 by 1,100 μ .

There is a dermal layer of smaller radiates, rays about 30 by 450 μ . Some of these are triactines, tangentially placed. Others are tetractines with three rays tangent and one ray hypodermal.

There are vast numbers of very distinctive microscleres. These are sometimes oxeas, but more often bent, even sharply bent. They may have two or more angular bends in their length. Some are strongylote. The size is usually about 3 by 100 μ , but with some little variation.

This species is strongly corticate like the type of the genus *Leucettusa*, which was described as *Leucetta corticata* Haeckel (1872, p. 129) from the West Indies; in fact, except for spiculation this species and the one here described are practically identical and very different from all other members of the genus. Yet *corticata* has few (if any) proper tetractines and none of the peculiar microscleres. On the other hand, *Leucettusa dictyogaster* Row and Hozawa (1931, p. 751), from West Australia, has spicules nearly exactly like those of *usa*, although its microscleres are twice as thick as those in the Greenland sponge. Furthermore, the Australian species is scarcely corticate at all, and has a very peculiar habitus of anastomosing tubes.

Leucosolenia macleayi (Lendenfeld)

This species was described as *Ascetta macleayi* by Lendenfeld (1885, p. 1086) from Australia, but it was soon found to be abundant and cosmopolitan. Captain Bartlett's specimen came from 20–30 fathoms near the entrance to Fury and Hecla Straits on September 3, 1933.

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